

Ontario Greenhouse Gas Emissions Targets:
A Technical Brief

Monday, June 18, 2007

gogreenontario.ca

The Situation

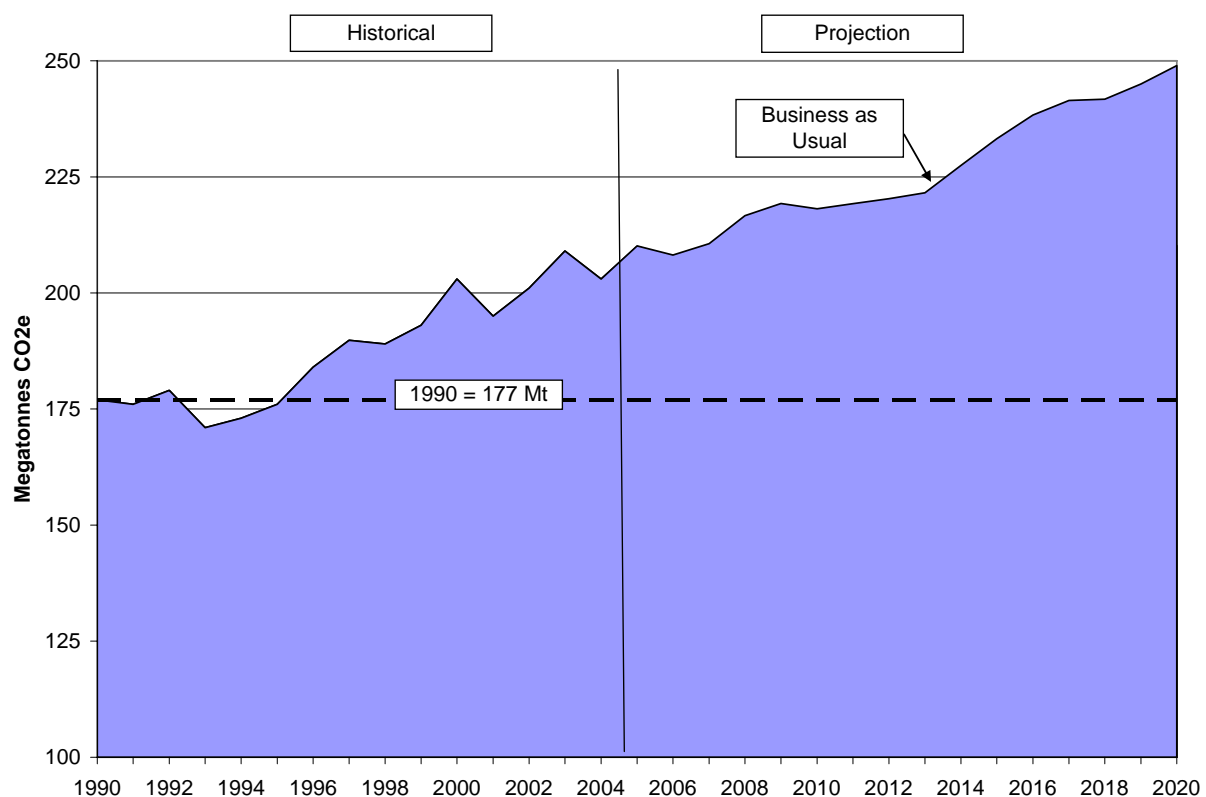
A wide range of authoritative and convincing scientific evidence supports the conclusion that to stop the concentration of greenhouse gases in the atmosphere from growing to ever more dangerous levels, global emissions from human activities must be rapidly reduced to a fraction of their current levels.

How We Got Here

Figure 1 illustrates historical greenhouse gas emissions in Ontario as well as emission projections under a business-as-usual scenario that would have occurred if we failed to take action. Underlying this projection, Ontario's population continues to grow by one percent per year, reaching 14.8 million by 2020. The provincial economy grows at over twice this rate and is projected to be 40% larger in 2020 than it is today. This growth is projected to lead to inevitable additional fuel and electricity use and greenhouse gas emissions, with total emissions reaching 249 million tonnes (Mt) carbon dioxide equivalent (CO₂e) by 2020. This is the trajectory on which Ontario's greenhouse gas emissions were growing before the impact of current government policies.

The challenge facing us is not only to eliminate the growth in emissions but also to reduce the absolute amount of greenhouse gases being emitted to the atmosphere.

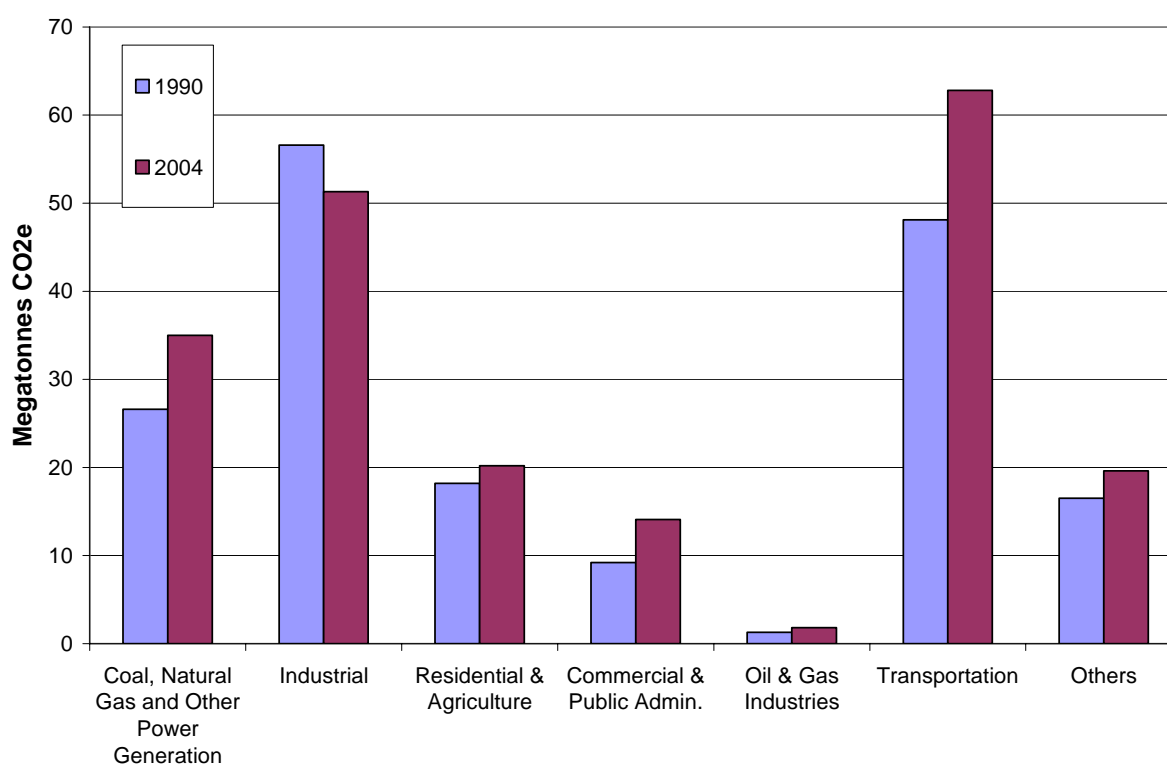
Figure 1. Greenhouse gas emissions trajectory for Ontario from 1990 to 2020:
Business-as-usual (forecast emissions at 2020 without government actions)



Where Emissions Come From

As illustrated in Figure 2, most of Ontario's emissions come from fossil fuel consumption: the gasoline and diesel fuels we burn in our cars and trucks; the natural gas and other fossil fuels we use to heat our buildings; the oil and gas fuels that industry burns to drive the kilns and furnaces; boiler plants that power our manufacturing activities; and, from coal-fired electricity generation. There are additional emissions that arise from waste landfills, and some agricultural and industrial processes. We also affect atmospheric levels of carbon through our land use practices, and particularly through the way we manage our agricultural and forest lands.

Figure 2. Ontario Greenhouse Gas Emissions by Sector



What We Have Done

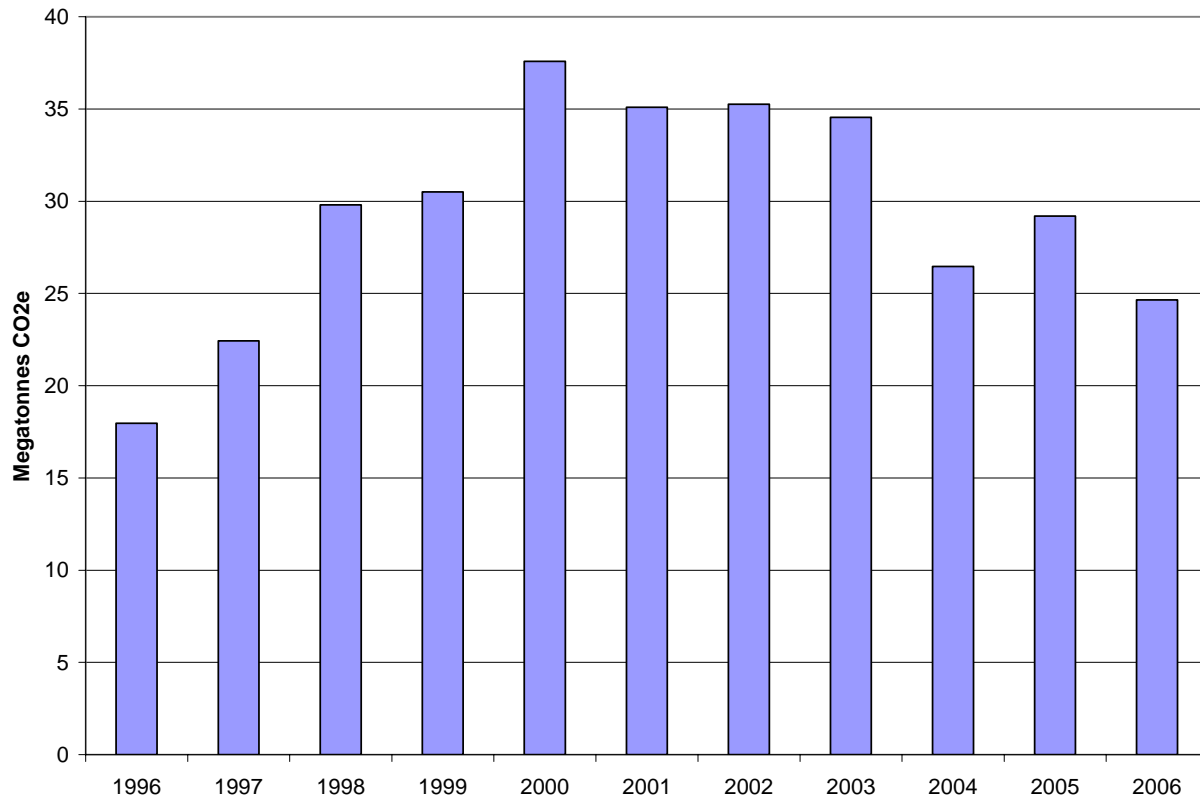
There are a number of current Ontario government policies and initiatives that have reduced emissions and that will continue to reduce emissions, below the business-as-usual case presented in Figure 1. These include:

- Coal phase-out;
- Changes to the Energy Efficiency Act and the Ontario Building Code;
- Ethanol blending of gasoline;
- Investments in public transit;
- The Places to Grow Act; and,

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- The Green Belt Act.

Figure 3 shows emissions from coal-fired power generation in Ontario from 1996 to 2006.

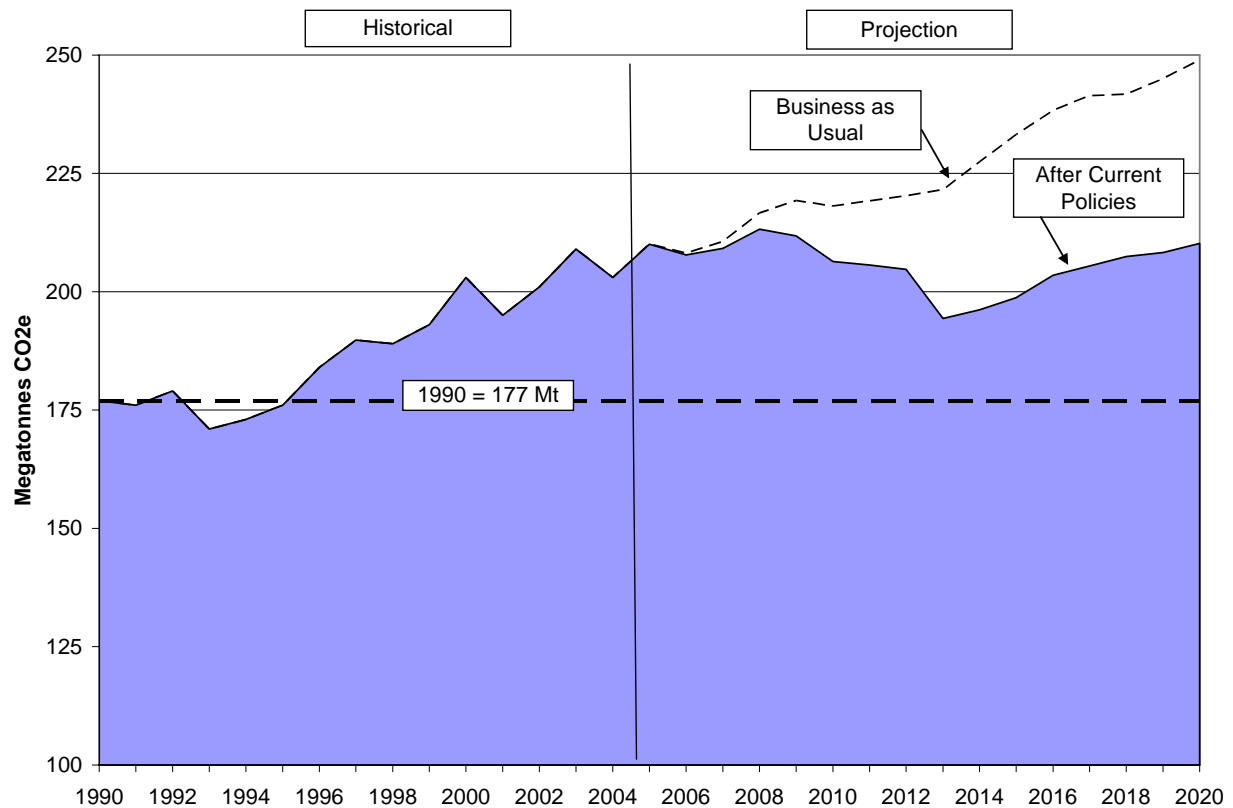
Figure 3. Greenhouse Gas Emissions from Coal-fired Generation in Ontario



The government's current policies will reduce greenhouse gas emissions in Ontario for the next several years, primarily due to the very deep reductions in emissions from the electric power sector. Power plant emissions will drop by 85% from 46 Mt CO₂e in 2003 to less than 7 Mt CO₂e by 2014 when the last of the coal plants is retired (Figure 4 below).

In the absence of further initiatives, total emissions would begin to grow again after 2014, albeit modestly, as underlying population and economic growth drive up energy and emissions from buildings, industrial processes, cars and trucks. Even so, as can be seen in Figure 4, by 2020 emissions would barely have returned to current levels and the net effect of current government policies is to essentially flatten the curve of greenhouse gas emissions growth in Ontario.

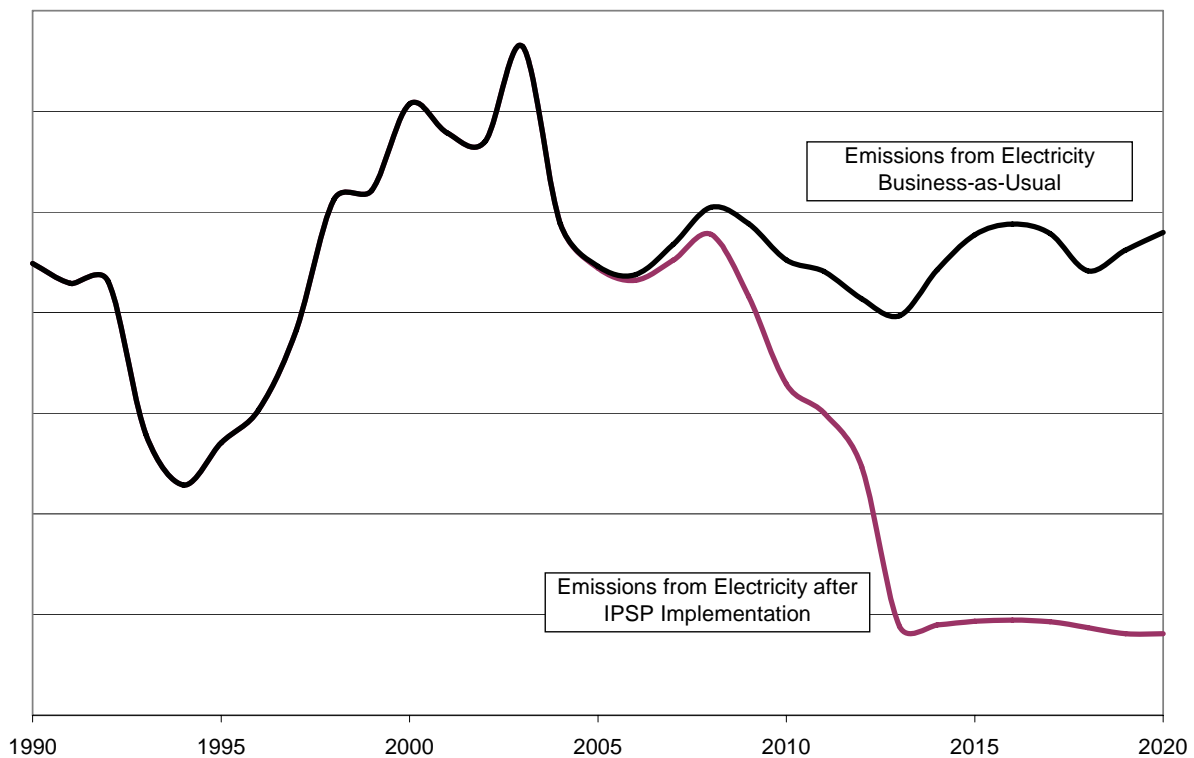
Figure 4. Greenhouse gas emissions trajectory for Ontario from 1990 to 2020:
Current Policies Case (where emissions would be by 2020 with current actions)



Some of the current government policies will take longer than others to have a significant effect on reducing emissions. The changes to the Building Code and the more energy efficient urban forms that will result from the Places to Grow initiative have large impacts on emissions over the long term, but they affect only new buildings and new neighbourhoods, and their greenhouse gas emission impacts will only begin to build by 2020.

In contrast, the electricity savings captured by regulations under the Energy Efficiency Act, the reductions in coal-fired power generation, increases in renewable power (e.g., solar and wind) and other elements of the draft Integrated Power System Plan together constitute one of the most aggressive and transformative emission reduction initiatives taken by any government in North America. As shown in Figure 5, current policies reduce the carbon footprint of Ontario electricity use over the next few years in what is expected to be a permanent transformation of Ontario's electric power sector.

Figure 5. Greenhouse Gas Emissions from Electricity Use in Ontario
(Historical to 2004, modeled thereafter)



So current policies are reducing emissions from the electricity sector and keeping total greenhouse gas emissions relatively flat. But is this occurring at the expense of Ontario's economy? Current government policies for greenhouse gas emission reductions will have net positive impacts on Gross Provincial Product (GPP – a measure of the size of the economy), population and disposable income over the period to 2020, even while emissions are held at or below current levels.

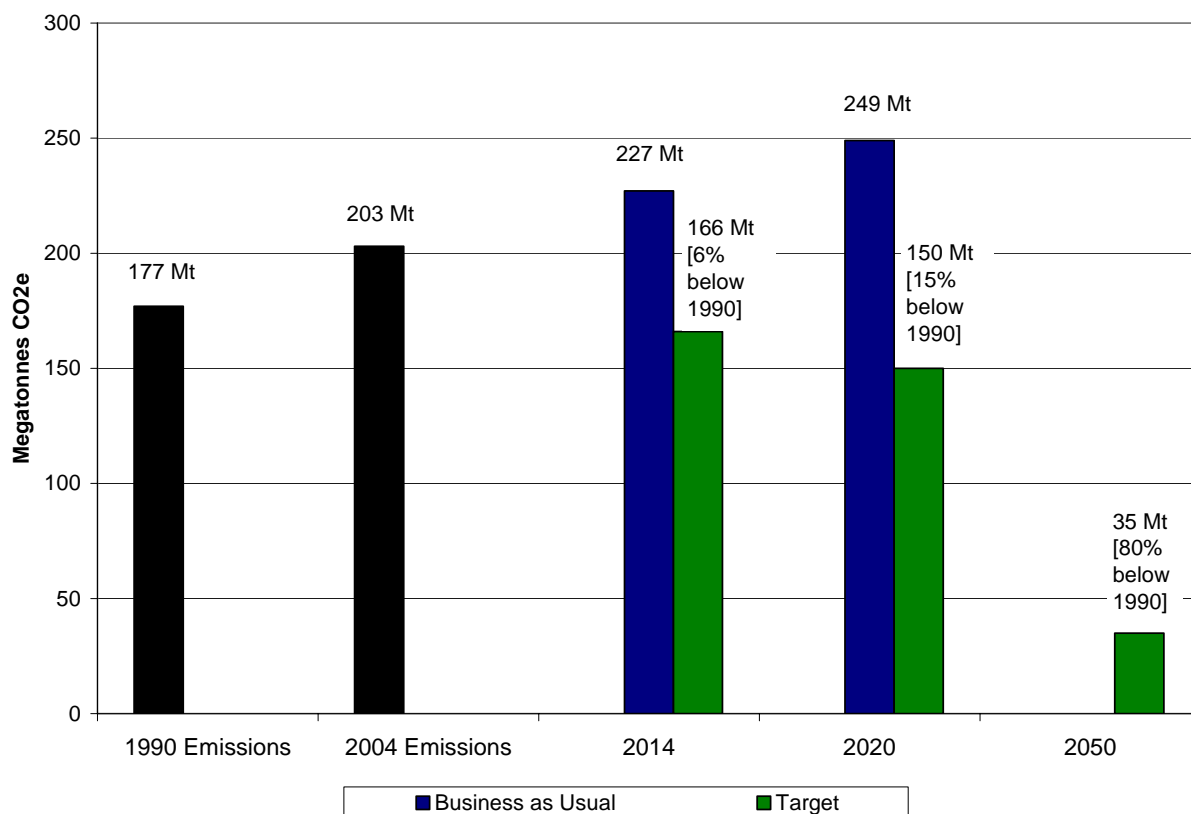
This is consistent with both observed trends and what analysts in other jurisdictions are reporting: relatively aggressive policies for greenhouse gas emission reduction can and do have positive economic impacts. New jobs are created as a result of the government's current policies, particularly in the power engineering and new electricity industry. Overall GPP, labour productivity and personal disposable income are all up compared to business-as-usual. The impacts are particularly strong in the near to medium term as the electricity sector goes through a transformation, and most of the jobs created are created between now and 2012.

Where We Need To Go

Greenhouse gas emissions growth has been essentially stable in Ontario for the past few years while population, economic output and employment have continued to grow, and this pattern is expected to continue as the result of current government policies. The challenge we now face is how we can meet the deeper emission reduction targets that climate science has identified as being necessary so that emissions continue to decrease and the emission curve takes a downward trend.

Figure 6 illustrates the targets Ontario is taking on to reduce emissions. By 2014, Ontario's GHG emissions will be 6% below 1990 levels and by 2020 emissions will be 15% below 1990 levels for a total emission reduction by 2020 of almost 100 million tonnes against business-as-usual.

Figure 6. Ontario's Greenhouse Gas Emissions Targets



How We Are Going To Get There

To achieve our targets, Ontario needs progress in every sector. There is no single or simple policy fix for bringing down emissions across the various sectors represented in Figures 7 and 8 (below). Each sector is characterized by different technologies and fuels, and more importantly by different relative prices, practices, behaviour, and investment patterns. What works for the freight industry may be different than what works for personal transportation, and what works for energy intensive primary producers like steel makers and paper makers will not necessarily be effective for secondary manufacturers like breweries and bakeries.

Figure 7 and Figure 8 depict where emissions reductions will have been achieved by 2014 and 2020, respectively, based on current and new policies.

Figure 7. Where Emissions Reductions Will Have Been Achieved by 2014:
Based on Current and New Policies

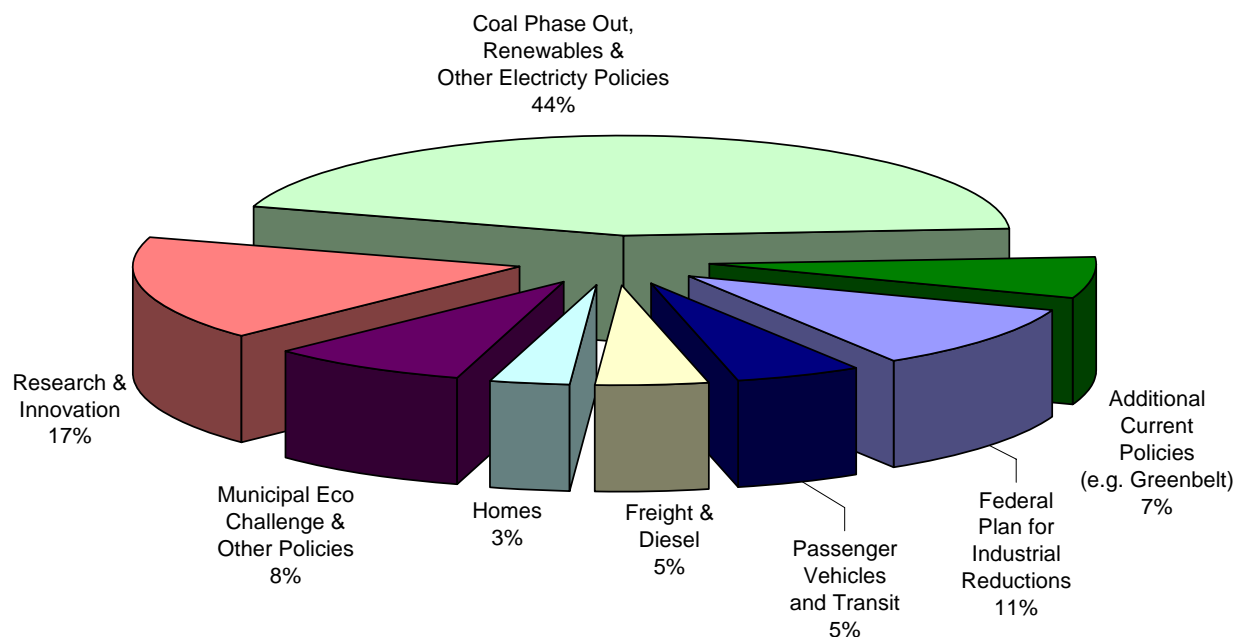
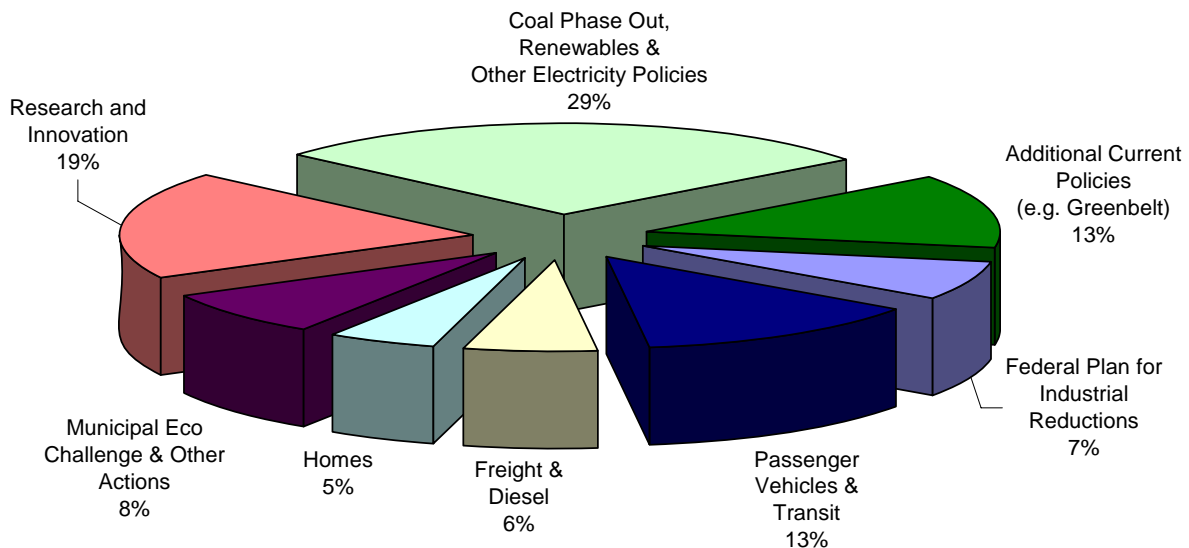


Figure 8. Where Emissions Reductions Will Have Been Achieved by 2020:
Based on Current and New Policies



In a number of areas, Ontario will have to work closely with other provinces, state governments and the federal government to deliver greenhouse gas emission reductions at least cost.

For industrial emissions, we will work with the federal government to ensure they recognize the early work that our industrial sectors have achieved, use the internationally recognized 1990 baseline, and to drive real, absolute reductions. We are also exploring a number of partnership opportunities including with New York and other members of the Regional Greenhouse Gas Initiative, and California and other members of the Western Regional Climate Action Initiative.

In the immediate term and stemming from the Spring 2007 Budget, our government will continue to take action on reducing greenhouse gas emissions related to buildings, land use, transportation, and industrial emissions. As well, we will continue on a path of innovation and transformation of key sectors. Examples of actions to reduce emissions of greenhouse gases include:

Existing Policies and Programs:

- Coal Phase Out
- Renewable electricity generation
- Electricity conservation measures
- Creation of the Greenbelt
- Places to Grow Act
- Ontario's new Building Code

Industry and Transportation

- Push for the development of a harmonized, continental approach to vehicle fuel-efficiency standards that are aggressive, fair and achievable
- Work with California on a continental low carbon fuel standard requiring producers to reduce carbon content in transportation fuels by 10% by 2020
- Unprecedented investments in Public Transit, including MoveOntario 2020
- Phase out chlorofluorocarbons (CFCs) in industrial, commercial, and institutional refrigeration units and chillers
- Explore partnership opportunities with other jurisdictions, including New York and other members of the Regional Greenhouse Gas Initiative, and California and other members of the Western Regional Climate Action Initiative; and,
- Work with the federal government to establish a strong Canadian emissions trading system.

Recent Programs in Ontario:

- Municipal Eco Challenge Fund
- Home energy audit rebate program
- Low energy design standard and green roof pilot for Ontario government
- Pilot program to reduce emissions from school buses
- 1.8 million new trees on the Greenbelt by 2010

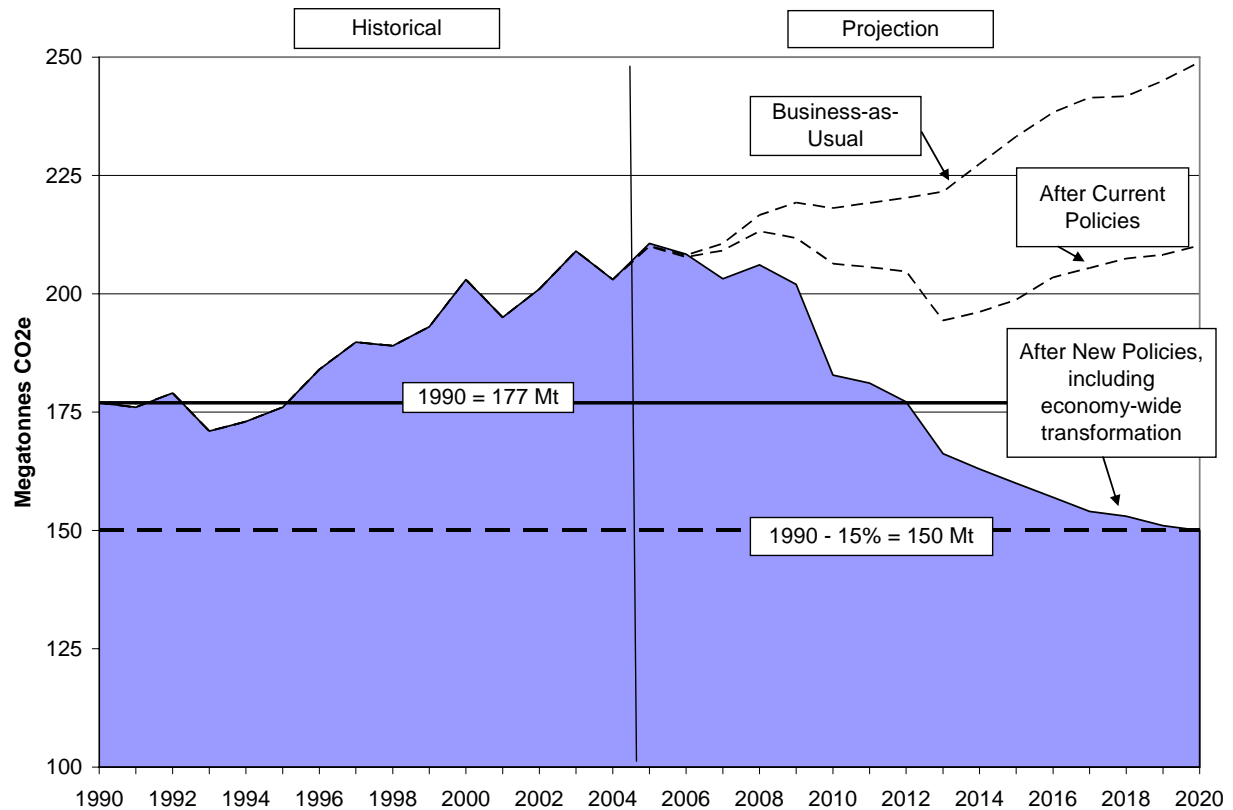
Research and Innovation:

- Ontario Bio-Auto Council
- Investment in lightweight and bio-based materials, along with the development of alternative fuels
- Convergence centre with private sector for bio-products and bio-materials
- University funding for research and innovation at Queen's University, the University of Ontario Institute of Technology, University of Western Ontario and others

Other significant policies will be announced in the weeks to come.

Figure 9 illustrates the bending of the emissions curve that will result from current and new policies which will drive the transformation of Ontario's economy towards a lower carbon, more sustainable future.

Figure 9. Greenhouse gas emissions trajectory for Ontario from 1990 to 2020:
Current and New Policies (where emissions would be by 2020 with current and planned actions)



Reducing greenhouse gas emissions has associated significant financial and economic benefits as well as environmental co-benefits. For example, efforts to reduce GHGs will also improve economic competitiveness in a world that is seeking low emission solutions and will generate employment across a broad spectrum of skills and professions. In addition, GHG reduction technologies sometimes reduce levels of air pollution and can enhance urban environments. As the world moves towards a low carbon future, technological innovation and advancement will be critical.

Low emission technologies are also superior technologies – green buildings outperform conventional buildings in terms of the productivity of their occupants, and companies that have pursued greenhouse gas emission reduction strategies are enjoying very significant financial and competitive advantages from the overall improvement in their productive efficiency and competitive position that very often comes with such strategies.

How We Will Measure Success

Greenhouse gas reduction policies require both urgency and sustained commitment, and both for the same reasons. Unless we act now, emission reductions will be further delayed and it takes time for policy and investment changes made now to have their full effect on reducing emissions. Because of this, it is important for the government to introduce mechanisms that will focus efforts by the public, government and industry, and to ensure transparency and accountability to the public on progress so far.

To ensure accountability, the government will report annually to the Legislature on the status of progress in achieving the climate change goals set out in this document. The Environmental Commissioner will provide transparency and review the government's progress.

How Will We Get to 2050

The challenge is to transform what is essentially a positive and historic economic opportunity into real changes in our economy. There are a myriad of policy challenges that face the task of bringing down greenhouse gas emissions, and what will work varies from sector to sector, from end-use to end-use, from fuel to fuel, and from place to place.

We are in the early stages of a transformation from an era of fossil fuel powered industrialization to a future of ecologically sustainable economic activity in which design and technology mimic nature itself in their use of materials and energy.

We know that at the heart of any prosperous, low carbon future must be an emphasis on innovation and knowledge and a focus on developing technologies and techniques that are ecologically sustainable. Innovation is the basis for the high technology, ecologically sustainable, information-intensive economy of the future. There is no doubt that successful innovation in both technology and technology deployment methods will be a hallmark of any successful economy in the low carbon world. The reason that low emission technologies, buildings, and techniques will be valued is because they will be *better* technologies, buildings and techniques. In this future, a highly educated work force and a high level of investment in R&D and in innovation of all kinds will be necessary conditions for success in the global economy.

Continued investments in the research, development and deployment of new sustainable technologies will position Ontario to take advantage of the low carbon economies of the future by ensuring our agriculture, forestry and manufacturing sectors have the skilled workforce and the infrastructure necessary for success. Ontario's commitment to innovation in targeted sectors will ensure that transformation strategies on the scale of what is being accomplished in the power generation sector can be accomplished so that future generations can enjoy a robust and sustainable economy and a healthy environment.

How Do We Compare

	Short	Medium	Long
Ontario	6% below 1990 levels by 2014	15% below 1990 levels by 2020	80% below 1990 levels by 2050
UK	12.5% below 1990 levels by 2008 – 2012 (Kyoto)	26-32% below 1990 levels by 2020	60% below 1990 levels by 2050
European Union	8% below 1990 levels by 2008 – 2012 (Kyoto)	20% below 1990 levels by 2020	Proposed: 50% below 1990 levels by 2050
North Eastern Governors and Eastern Canadian Premiers Climate Action Plan	1990 levels by 2010	10% below 1990 levels by 2020	75% - 85% below current levels by 2050
Quebec	6% below 1990 levels by 2012	10% below 1990 levels by 2020	
New Brunswick	At 1990 levels by 2012	10% below 1990 levels by 2020	
Manitoba	18% below 1990 levels by 2010 and 23% below 1990 levels by 2012		
BC		33% below current levels by 2020 and 10% below 1990 levels by 2020	
Canada		20% from 2006 levels by 2020	60 – 70% below 2006 levels by 2050
California	2000 levels by 2010	1990 levels by 2020	80% below 1990 levels by 2050
Arizona		Reduction to 2000 levels by 2020	Up to 50% below 2000 emissions by 2040
Connecticut	1990 levels by 2010	10% below 1990 levels by 2020	Up to 75% - 80% below 2003 levels by 2050
Maine	1990 levels by 2010	10% below 1990 levels by 2020	Up to 75% below 2003 levels by 2050
Massachusetts	1990 levels by 2010	10% below 1990 levels by 2020	75% - 80% below 1990 levels